



1600

1415 ENTERED

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/911,826A

DATE: 03/07/2002

TIME: 15:13:40

Input Set : A:\pto.vsk.txt

Output Set: N:\CRF3\03072002\I911826A.raw

3 <110> APPLICANT: Rotin, Daniela and Pham, Nam
 5 <120> TITLE OF INVENTION: RAS Activator Nucleic Acid Molecules, Polypeptides and
 6 Methods of Use
 8 <130> FILE REFERENCE: DDW-5001-US
 10 <140> CURRENT APPLICATION NUMBER: 09/911,826A
 C--> 11 <141> CURRENT FILING DATE: 2002-02-26
 13 <150> PRIOR APPLICATION NUMBER: PCT/CA00/00042
 14 <151> PRIOR FILING DATE: 2000-01-20
 16 <150> PRIOR APPLICATION NUMBER: 2,259,830
 17 <151> PRIOR FILING DATE: 1999-01-20
 19 <160> NUMBER OF SEQ ID NOS: 27
 21 <170> SOFTWARE: PatentIn Ver. 2.1
 23 <210> SEQ ID NO: 1
 24 <211> LENGTH: 6568
 25 <212> TYPE: DNA
 26 <213> ORGANISM: Homo sapiens
 28 <220> FEATURE:
 29 <221> NAME/KEY: CDS
 30 <222> LOCATION: (63)..(4562)
 32 <400> SEQUENCE: 1
 33 cttgccatcg tgagagattg gtacatgatg tgtaaattca gttcagcata tgtttcttca 60
 35 tt atg aaa cca cta gca atc cca gct aac cat gga gtt atg ggc cag 107
 36 Met Lys Pro Leu Ala Ile Pro Ala Asn His Gly Val Met Gly Gln
 37 1 5 10 15
 39 cag gag aaa cac tca ctt cct gca gat ttc aca aaa ctg cat ctt act 155
 40 Gln Glu Lys His Ser Leu Pro Ala Asp Phe Thr Lys Leu His Leu Thr
 41 20 25 30
 43 gac agt ctc cac cca cag gtg acc cac gtt tct tct agc cat tca gga 203
 44 Asp Ser Leu His Pro Gln Val Thr His Val Ser Ser Ser His Ser Gly
 45 35 40 45
 47 tgt agt atc act agt gat tct ggg agc agc agt ctt tct gat atc tac 251
 48 Cys Ser Ile Thr Ser Asp Ser Gly Ser Ser Ser Leu Ser Asp Ile Tyr
 49 50 55 60
 51 cag gcc aca gaa agc gag gct ggt gat atg gac ctg agt ggg ttg cca 299
 52 Gln Ala Thr Glu Ser Glu Ala Gly Asp Met Asp Leu Ser Gly Leu Pro
 53 65 70 75
 55 gaa aca gca gtg gat tcc gaa gac gac gac gat gaa gaa gac att gag 347
 56 Glu Thr Ala Val Asp Ser Glu Asp Asp Asp Asp Glu Glu Asp Ile Glu
 57 80 85 90 95
 59 aga gca tca gat cct ctg atg agc agg gac att gtg aga gac tgc cta 395
 60 Arg Ala Ser Asp Pro Leu Met Ser Arg Asp Ile Val Arg Asp Cys Leu
 61 100 105 110
 63 gag aag gac cca att gac cgg aca gat gat gac att gaa caa ctc ttg 443

RECEIVED

MAR 7

TECH OE

RAW SEQUENCE LISTING

DATE: 03/07/2002

PATENT APPLICATION: US/09/911,826A

TIME: 15:13:40

Input Set : A:\pto.vsk.txt

Output Set: N:\CRF3\03072002\I911826A.raw

```

64 Glu Lys Asp Pro Ile Asp Arg Thr Asp Asp Asp Ile Glu Gln Leu Leu
65          115          120          125
67 gaa ttt atg cac cag ttg cct gct ttt gcc aat atg aca atg tca gtg 491
68 Glu Phe Met His Gln Leu Pro Ala Phe Ala Asn Met Thr Met Ser Val
69          130          135          140
71 agg cga gaa ctc tgt gct gtg atg gtg ttc gca gtg gtg gaa aga gca 539
72 Arg Arg Glu Leu Cys Ala Val Met Val Phe Ala Val Val Glu Arg Ala
73          145          150          155
75 ggg acc ata gtg tta aat gat ggt gaa gag ctg gac tcc tgg tca gtg 587
76 Gly Thr Ile Val Leu Asn Asp Gly Glu Glu Leu Asp Ser Trp Ser Val
77 160          165          170          175
79 att ctc aat gga tct gtg gaa gtg act tat cca gat gga aaa gca gaa 635
80 Ile Leu Asn Gly Ser Val Glu Val Thr Tyr Pro Asp Gly Lys Ala Glu
81          180          185          190
83 ata ctg tgc atg gga aat agt ttt ggt gtc tct cct acc atg gac aaa 683
84 Ile Leu Cys Met Gly Asn Ser Phe Gly Val Ser Pro Thr Met Asp Lys
85          195          200          205
87 gaa tac atg aaa gga gtg atg aga aca aag gtg gat gac tgc cag ttt 731
88 Glu Tyr Met Lys Gly Val Met Arg Thr Lys Val Asp Asp Cys Gln Phe
89          210          215          220
91 gtc tgc ata gcc cag caa gat tac tgc cgt att ctc aat caa gta gaa 779
92 Val Cys Ile Ala Gln Gln Asp Tyr Cys Arg Ile Leu Asn Gln Val Glu
93          225          230          235
95 aag aac atg caa aaa gtt gaa gag gaa gga gag att gtt atg gtg aaa 827
96 Lys Asn Met Gln Lys Val Glu Glu Glu Gly Glu Ile Val Met Val Lys
97 240          245          250          255
99 gaa cac cga gaa ctt gat cga act gga aca aga aag gga cac att gtc 875
100 Glu His Arg Glu Leu Asp Arg Thr Gly Thr Arg Lys Gly His Ile Val
101          260          265          270
103 atc aag ggt acc tca gaa agg tta aca atg cat ttg gtg gaa gag cat 923
104 Ile Lys Gly Thr Ser Glu Arg Leu Thr Met His Leu Val Glu Glu His
105          275          280          285
107 tca gta gta gat cca aca ttc ata gaa gac ttt ctg ttg acc tat agg 971
108 Ser Val Val Asp Pro Thr Phe Ile Glu Asp Phe Leu Leu Thr Tyr Arg
109          290          295          300
111 act ttt ctt tct agc cca atg gaa gtg ggc aaa aag tta ttg gag tgg 1019
112 Thr Phe Leu Ser Ser Pro Met Glu Val Gly Lys Lys Leu Leu Glu Trp
113          305          310          315
115 ttt aat gac ccg agc ctc agg gat aag gtt aca cgg gta gta tta ttg 1067
116 Phe Asn Asp Pro Ser Leu Arg Asp Lys Val Thr Arg Val Val Leu Leu
117 320          325          330          335
119 tgg gta aat aat cac ttc aat gac ttt gaa gga gat cct gca atg act 1115
120 Trp Val Asn Asn His Phe Asn Asp Phe Glu Gly Asp Pro Ala Met Thr
121          340          345          350
123 cga ttt tta gaa gaa ttt gaa aac aat ctg gaa aga gag aaa atg ggt 1163
124 Arg Phe Leu Glu Glu Phe Glu Asn Asn Leu Glu Arg Glu Lys Met Gly
125          355          360          365
127 gga cac cta agg ctg ttg aat atc gcg tgt gct gct aaa gca aaa aga 1211
128 Gly His Leu Arg Leu Leu Asn Ile Ala Cys Ala Ala Lys Ala Lys Arg

```

RAW SEQUENCE LISTING

DATE: 03/07/2002

PATENT APPLICATION: US/09/911,826A

TIME: 15:13:40

Input Set : A:\pto.vsk.txt

Output Set: N:\CRF3\03072002\I911826A.raw

```

129          370          375          380
131 aga ttg atg acg tta aca aaa cca tcc cga gaa gct cct ttg cct ttt 1259
132 Arg Leu Met Thr Leu Thr Lys Pro Ser Arg Glu Ala Pro Leu Pro Phe
133          385          390          395
135 atc tta ctt gga ggc tct gag aag gga ttt gga atc ttt gtt gac agt 1307
136 Ile Leu Leu Gly Gly Ser Glu Lys Gly Phe Gly Ile Phe Val Asp Ser
137 400          405          410          415
139 gta gat tca ggt agc aaa gca act gaa gca ggc ttg aaa cgg ggg gat 1355
140 Val Asp Ser Gly Ser Lys Ala Thr Glu Ala Gly Leu Lys Arg Gly Asp
141          420          425          430
143 cag ata tta gaa gta aat ggc caa aac ttt gaa aac att cag ctg tca 1403
144 Gln Ile Leu Glu Val Asn Gly Gln Asn Phe Glu Asn Ile Gln Leu Ser
145          435          440          445
147 aaa gct atg gaa att ctt aga aat aac aca cat tta tct atc act gtg 1451
148 Lys Ala Met Glu Ile Leu Arg Asn Asn Thr His Leu Ser Ile Thr Val
149          450          455          460
151 aaa acc aat tta ttt gta ttt aaa gaa ctt cta aca aga ttg tca gaa 1499
152 Lys Thr Asn Leu Phe Val Phe Lys Glu Leu Leu Thr Arg Leu Ser Glu
153          465          470          475
155 gag aaa aga aat ggt gcc ccc cac ctt cct aaa att ggt gac att aaa 1547
156 Glu Lys Arg Asn Gly Ala Pro His Leu Pro Lys Lys Ile Gly Asp Ile Lys
157 480          485          490          495
159 aag gcc agt cgc tac tcc att cca gat ctt gct gta gat gta gaa cag 1595
160 Lys Ala Ser Arg Tyr Ser Ile Pro Asp Leu Ala Val Asp Val Glu Gln
161          500          505          510
163 gtg ata gga ctt gaa aaa gtg aac aaa aaa agt aaa gcc aac act gtg 1643
164 Val Ile Gly Leu Glu Lys Val Asn Lys Lys Ser Lys Ala Asn Thr Val
165          515          520          525
167 gga gga agg aac aag ctg aaa aag ata ctc gac aag act cgg atc agt 1691
168 Gly Gly Arg Asn Lys Leu Lys Lys Ile Leu Asp Lys Thr Arg Ile Ser
169          530          535          540
171 atc ttg cca cag aaa cca tac aat gat att ggg att ggt cag tct caa 1739
172 Ile Leu Pro Gln Lys Pro Tyr Asn Asp Ile Gly Ile Gly Gln Ser Gln
173          545          550          555
175 gat gac agc ata gta gga tta agg cag aca aag cac atc cca act gca 1787
176 Asp Asp Ser Ile Val Gly Leu Arg Gln Thr Lys His Ile Pro Thr Ala
177 560          565          570          575
179 ttg cct gtc agt gga acc tta tca tcc agt aat cct gat tta ttg cag 1835
180 Leu Pro Val Ser Gly Thr Leu Ser Ser Ser Asn Pro Asp Leu Leu Gln
181          580          585          590
183 tca cat cat cgc att tta gac ttc agt gct act cct gac ttg cca gat 1883
184 Ser His His Arg Ile Leu Asp Phe Ser Ala Thr Pro Asp Leu Pro Asp
185          595          600          605
187 caa gtg cta agg gtt ttt aag gct gat cag caa agc cgc tac atc atg 1931
188 Gln Val Leu Arg Val Phe Lys Ala Asp Gln Gln Ser Arg Tyr Ile Met
189          610          615          620
191 atc agt aag gac act aca gca aag gaa gtg gtc att cag gct atc agg 1979
192 Ile Ser Lys Asp Thr Thr Ala Lys Glu Val Val Ile Gln Ala Ile Arg
193          625          630          635

```

RAW SEQUENCE LISTING

DATE: 03/07/2002

PATENT APPLICATION: US/09/911,826A

TIME: 15:13:40

Input Set : A:\pto.vsk.txt

Output Set: N:\CRF3\03072002\I911826A.raw

```

195 gag ttt gct gtt act gcc acc ccg gat caa tat tca cta tgt gag gtc 2027
196 Glu Phe Ala Val Thr Ala Thr Pro Asp Gln Tyr Ser Leu Cys Glu Val
197 640 645 650 655
199 tct gtc aca cct gag gga gta atc aaa caa aga aga ctt cca gat cag 2075
200 Ser Val Thr Pro Glu Gly Val Ile Lys Gln Arg Arg Leu Pro Asp Gln
201 660 665 670
203 ctt tcc aaa ctt gca gac aga ata caa ctg agt gga agg tat tat ctg 2123
204 Leu Ser Lys Leu Ala Asp Arg Ile Gln Leu Ser Gly Arg Tyr Tyr Leu
205 675 680 685
207 aaa aac aac atg gaa aca gaa act ctt tgt tca gat gaa gat gct cag 2171
208 Lys Asn Asn Met Glu Thr Glu Thr Leu Cys Ser Asp Glu Asp Ala Gln
209 690 695 700
211 gag ttg ttg aga gag agt caa att tcc ctc ctt cag ctc agc act gtg 2219
212 Glu Leu Leu Arg Glu Ser Gln Ile Ser Leu Leu Gln Leu Ser Thr Val
213 705 710 715
215 gaa gtt gca aca cag ctc tct atg cga aat ttt gaa ctc ttt cgc aac 2267
216 Glu Val Ala Thr Gln Leu Ser Met Arg Asn Phe Glu Leu Phe Arg Asn
217 720 725 730 735
219 att gaa cct act gaa tat ata gat gat tta ttt aaa ctc aga tca aaa 2315
220 Ile Glu Pro Thr Glu Tyr Ile Asp Asp Leu Phe Lys Leu Arg Ser Lys
221 740 745 750
223 acc agc tgt gcc aac ctg aag aga ttt gaa gaa gtc att aac cag gaa 2363
224 Thr Ser Cys Ala Asn Leu Lys Arg Phe Glu Glu Val Ile Asn Gln Glu
225 755 760 765
227 aca ttt tgg gta gca tct gaa att ctc aga gaa aca aac cag ctg aag 2411
228 Thr Phe Trp Val Ala Ser Glu Ile Leu Arg Glu Thr Asn Gln Leu Lys
229 770 775 780
231 agg atg aag atc att aag cat ttc atc aag ata gca ctg cac tgt agg 2459
232 Arg Met Lys Ile Ile Lys His Phe Ile Lys Ile Ala Leu His Cys Arg
233 785 790 795
235 gaa tgc aag aat ttt aac tca atg ttt gca atc atc agt ggc cta aac 2507
236 Glu Cys Lys Asn Phe Asn Ser Met Phe Ala Ile Ile Ser Gly Leu Asn
237 800 805 810 815
239 ctg gca cca gtg gca aga ctg cga acg acc tgg gag aaa ctt ccc aat 2555
240 Leu Ala Pro Val Ala Arg Leu Arg Thr Thr Trp Glu Lys Leu Pro Asn
241 820 825 830
243 aaa tac gaa aaa cta ttt caa gat ctc caa gac ctg ttt gat cct tcc 2603
244 Lys Tyr Glu Lys Leu Phe Gln Asp Leu Gln Asp Leu Phe Asp Pro Ser
245 835 840 845
247 aga aac atg gca aaa tat cgt aat gtt ctc aat agt caa aat cta caa 2651
248 Arg Asn Met Ala Lys Tyr Arg Asn Val Leu Asn Ser Gln Asn Leu Gln
249 850 855 860
251 cct ccc ata atc cct cta ttc cca gtt atc aaa aag gat ctc acc ttc 2699
252 Pro Pro Ile Ile Pro Leu Phe Pro Val Ile Lys Lys Asp Leu Thr Phe
253 865 870 875
255 ctt cac gaa gga aat gac tca aaa gta gac ggg ctg gtc aat ttt gag 2747
256 Leu His Glu Gly Asn Asp Ser Lys Val Asp Gly Leu Val Asn Phe Glu
257 880 885 890 895
259 aag cta agg atg att gca aaa gaa att cgt cac gtt ggc cga atg gct 2795

```

RAW SEQUENCE LISTING

DATE: 03/07/2002

PATENT APPLICATION: US/09/911,826A

TIME: 15:13:40

Input Set : A:\pto.vsk.txt

Output Set: N:\CRF3\03072002\I911826A.raw

```

260 Lys Leu Arg Met Ile Ala Lys Glu Ile Arg His Val Gly Arg Met Ala
261          900          905          910
263 tca gtg aac atg gac cct gcc ctc atg ttc agg act cgg aag aag aaa 2843
264 Ser Val Asn Met Asp Pro Ala Leu Met Phe Arg Thr Arg Lys Lys Lys
265          915          920          925
267 tgg cgg agt ttg ggg tct ctc agc cag ggt agt aca aat gca aca gtg 2891
268 Trp Arg Ser Leu Gly Ser Leu Ser Gln Gly Ser Thr Asn Ala Thr Val
269          930          935          940
271 cta gat gtt gct cag aca ggt ggt cat aaa aag cgg gta cgt cgt agt 2939
272 Leu Asp Val Ala Gln Thr Gly Gly His Lys Lys Arg Val Arg Arg Ser
273          945          950          955
275 tcc ttt ctc aat gcc aaa aag ctt tat gaa gat gcc caa atg gct cga 2987
276 Ser Phe Leu Asn Ala Lys Lys Leu Tyr Glu Asp Ala Gln Met Ala Arg
277 960          965          970          975
279 aaa gtg aag cag tac ctt tcc aat ttg gag cta gaa atg gac gag gag 3035
280 Lys Val Lys Gln Tyr Leu Ser Asn Leu Glu Leu Glu Met Asp Glu Glu
281          980          985          990
283 agt ctt cag aca tta tct ctg cag tgt gag cca gca acc aac aca ttg 3083
284 Ser Leu Gln Thr Leu Ser Leu Gln Cys Glu Pro Ala Thr Asn Thr Leu
285          995          1000          1005
287 cct aag aat cct ggt gac aaa aag cct gtc aaa tcc gag acc tct cca 3131
288 Pro Lys Asn Pro Gly Asp Lys Lys Pro Val Lys Ser Glu Thr Ser Pro
289          1010          1015          1020
291 gta gct cca agg gca ggg tca caa cag aaa gct cag tcc ctg cca cag 3179
292 Val Ala Pro Arg Ala Gly Ser Gln Gln Lys Ala Gln Ser Leu Pro Gln
293          1025          1030          1035
295 ccc cag cag cag cca cca cca gca cat aaa atc aac cag gga cta cag 3227
296 Pro Gln Gln Gln Pro Pro Pro Ala His Lys Ile Asn Gln Gly Leu Gln
297 1040          1045          1050          1055
299 gtt ccc gcc gtg tcc ctt tat cct tca cgg aag aaa gtg ccc gta aag 3275
300 Val Pro Ala Val Ser Leu Tyr Pro Ser Arg Lys Lys Val Pro Val Lys
301          1060          1065          1070
303 gat ctc cca cct ttt ggc ata aac tct cca caa gct tta aaa aaa att 3323
304 Asp Leu Pro Pro Phe Gly Ile Asn Ser Pro Gln Ala Leu Lys Lys Ile
305          1075          1080          1085
307 ctt tct ttg tct gaa gaa gga agt ttg gaa cgt cac aag aaa cag gct 3371
308 Leu Ser Leu Ser Glu Glu Gly Ser Leu Glu Arg His Lys Lys Gln Ala
309          1090          1095          1100
311 gaa gat aca ata tca aat gca tct tcg cag ctt tct tct cct cct act 3419
312 Glu Asp Thr Ile Ser Asn Ala Ser Ser Gln Leu Ser Ser Pro Pro Thr
313          1105          1110          1115
315 tct cca cag agt tct cca agg aaa ggc tat act ttg gct ccc agt ggt 3467
316 Ser Pro Gln Ser Ser Pro Arg Lys Gly Tyr Thr Leu Ala Pro Ser Gly
317 1120          1125          1130          1135
319 act gtg gat aat ttt tca gat tct ggt cac agt gaa att tct tca cga 3515
320 Thr Val Asp Asn Phe Ser Asp Ser Gly His Ser Glu Ile Ser Ser Arg
321          1140          1145          1150
323 tcc agt att gtt agc aat tcg tct ttt gac tca gtg cca gtc tca ctg 3563
324 Ser Ser Ile Val Ser Asn Ser Ser Phe Asp Ser Val Pro Val Ser Leu

```

RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/09/911,826A

DATE: 03/07/2002
TIME: 15:13:41

Input Set : A:\pto.vsk.txt
Output Set: N:\CRF3\03072002\I911826A.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:4; Xaa Pos. 203,227,239,271,279
Seq#:5; Xaa Pos. 16,18,45,59,61,151,166,215
Seq#:6; Xaa Pos. 1,35,123,178,239
Seq#:15; Xaa Pos. 50

VERIFICATION SUMMARY

DATE: 03/07/2002

PATENT APPLICATION: US/09/911,826A

TIME: 15:13:41

Input Set : A:\pto.vsk.txt

Output Set: N:\CRF3\03072002\I911826A.raw

L:11 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:746 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:4 after pos.:192
L:752 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:4 after pos.:224
L:758 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:4 after pos.:256
L:761 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:4 after pos.:272
L:776 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:0
L:779 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:16
L:782 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:32
L:785 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:48
L:803 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:144
L:806 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:160
L:815 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:208
L:836 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:0
L:842 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:32
L:857 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:112
L:869 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:176
L:878 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:224
L:1258 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:15 after pos.:48